Motivation Science

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BRIEF REPORT

Going the Distance on the Pacific Crest Trail: The Vital Role of Identified Motivation

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Completing the 2,650-mile Pacific Crest Trail (PCT) requires strong motivation, but what kind? This 2-wave study used the relative autonomy continuum (RAC) of self-determination theory (SDT) to assess thru-hikers' initial and final hike motivations, and also assessed their subjective well-being (SWB) before and after the hike. Initial motivations did not predict PCT completion or total distance covered. Instead, increases in both identified and introjected motivation *during* the journey predicted hike performance. Also, completing the PCT did not affect participants' SWB, *unless* they started with, or increased in, autonomous motivation. Results suggest that finishing long and grueling projects may require developing greater internal motivation en route. This can help people's performance and also provide them with well-being benefits.

Keywords: self-determination theory, Pacific Crest Trail, identified motivation

The 2,650-mile Pacific Crest Trail (PCT) links Mexico and Canada along the mountainous spine of the U.S. West Coast. Each summer nearly 1,000 people attempt to complete the trail, beginning in March or April and ending in September or October. The trip is arduous, requiring hikers to carry 40-plus pounds of weight while climbing almost 500,000 vertical feet, summiting many snowy mountain passes, and crossing many raging streams. According to the PCT Association (https://www.pcta.org/discover-the-trail/thru-hiking-long-distance-hiking/thruhiker-faq/), only about 60% of thru-hikers actually finish the 5-month marathon—those who can average the required 18 miles a day without succumbing to injuries, fatigue, or sheer loss of will.

Predicting Hike Distance/Completion

What motivations are most helpful for completing the PCT? To address this question I drew from Self-determination theory (SDT; Ryan & Deci, 2017), and its relative autonomy continuum (RAC). SDT stipulates that the major motivations behind a given behavior can be aligned on a continuum ranging from very nonautonomous or controlled at one end, to very autonomous and self-determined at the other (Ryan & Connell, 1989; Sheldon, Osin, Gordeeva, Suchkov, & Sychev, 2017). In this light, the research question became: Which motivations, located where on the RAC, are most important for completing the PCT? Addressing this question requires further consideration of the RAC.

At the rightmost side of the RAC, the most autonomous (i.e., self-endorsed and volitional) motivation is intrinsic motivation, in which the experience itself is the reward. Decades of re-

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search have shown that intrinsic motivation is generally beneficial for peoples' well-being and performance (Ryan & Deci, 2017). Unfortunately, intrinsic motivation can be undermined by controlling forces or difficulties within the environment (Deci, Koestner, & Ryan, 1999), to be replaced by extrinsic (i.e., ends-oriented rather than process-oriented) forms of motivation.

And indeed, many PCT hikers chronicle the processes by which their initial exuberance dissipated, as difficulties and injuries mounted. In this case the second-most autonomous form of motivation on the RAC, identified motivation, may be helpful. With identified motivation, one performs the activity because it is important to one's sense of self; the behavior is a source of meaning and value, even if it is not enjoyable.

Next from the right within the RAC is self-esteem motivation. This approach motivation is still on the autonomous side of the RAC (Sheldon et al., 2017), but just barely, because striving for contingent self-regard can create problems (Crocker & Park, 2004; Rogers, 1964). It might seem that self-esteem motivation should help a hiker keep going during the hike—to prove to themselves that they can do it. However, self-esteem motivation, underlain by a sought-after self-image, may not be as effective as identified motivation, underlain by deep value commitments.

Next within the RAC is introjected motivation. This avoidance motivation is on the controlled side of the RAC, because it involves "forcing" oneself do the behavior, in order to evade guilt or shame. Still, introjected motivation reflects some degree of internalization, and indeed, it can promote strong behavioral persistence (Ryan, Plant, & O'Malley, 1995), even though that compulsive persistence might not, in some cases, be considered clinically healthy.

Next within the RAC is external motivation, which involves acting for external rewards or approval or to avoid negative consequences. This motivation is on the controlled side of the RAC, because the person feels the behavior is elicited by external forces. Finally, the sixth motivation within the RAC is amotivation, defined as enacting a behavior without a stable intention or positive expectancies. The amotivated person is only going through the motions, with no self-involvement at all. I expected these two motivations to be very low in this sample.

My primary study hypothesis was that the three internalized or partly internalized motivations (identified motivation, self-esteem motivation, and introjected motivation) would best predict trail completion or distance covered. This is because they should remain relevant in the long-term, even after initial intrinsic motivations are suppressed or undermined. Of the three, I expected identified motivation to be the strongest predictor, because it is most autonomous of the three. I also predicted that *increases* in autonomous motivation would be associated with performance, since such increases bespeak a successful internalization process, in the language of SDT's "organismic integration minitheory" (Ryan & Deci, 2017). And indeed, exercise research often finds that the motivational factors involved in exercise maintenance are different from those involved in exercise initiation (Weinberg, 2018).

Effects of Hiking on Subjective Well-Being

I also measured participants' subjective well-being (SWB; Diener, 1994). I had no hypotheses concerning the effect of completing the PCT on participants' SWB, because completion may or may not be a healthy accomplishment—in some cases it may reveal rigidity or psychodynamic problems. To test this idea, hypothesis 2 stated that hike performance in *combination* with autonomous motivation would be associated with increases in SWB. This moderator prediction was based on past research showing that autonomous goal motivation boosts the effects of goal-attainment on well-being (Sheldon & Elliot, 1999; Sheldon & Kasser, 1998).

Method

Participants and Procedure

Participants were recruited for the two part study in early 2018, via posts to relevant Facebook groups. The survey was described as "a study of people's motivation to hike the PCT." No incentive was offered for participation.

One hundred forty-five participants completed the Time 1 survey, and 93 of these completed the Time 2 survey. Attrition analyses showed no Time 1 variable differences between Time 2 survey completers and noncompleters. The final sample included 42 men, 50 women,

and 1 transgender/other, with an average age of 37 (range 19 to 74). Seven had never backpacked before, 37 had backpacked "a few times," 46 had backpacked "quite a lot," and 4 "all my life." Fifty-six were American, with a wide range of other nationalities represented.

Measures

Motivations. To measure hiker motivations I used the 24-item Comprehensive Relative Autonomy Index (C-RAI; Sheldon et al., 2017), administered with a 5-point "not at all" to "very much" response scale. At Time 1 participants read: "Below are 24 statements about why you are trying to thru-hike the PCT. Please rate the accuracy of each statement. Many of them may apply." At Time 2 the same items were again provided, reworded to address "why you tried to hike the PCT."

The C-RAI was developed via a thorough content analysis of the published scales in the complex RAC literature, attempting to distill all of the relevant concepts into a single scale. Its dimensionality has been supported by cluster, circumplex, latent profile, and multidimensional scaling analyses (Sheldon et al., 2017). The C-RAI contains six subscales: intrinsic ("because hiking the PCT will be interesting"), identified ("because hiking the PCT is personally important to me"), self-esteem ("because I want to feel proud of myself"), introjected ("because I will feel like a failure if I didn't hike the PCT"), external ("because important people will like me better if I complete the PCT"), and amotivated ("honestly, I don't know why I am hiking the PCT").

Separate scores were computed for each of the six subscales. A relative autonomy index (RAI) was also computed by adding together the intrinsic, identified, and self-esteem motivation scores and subtracting the amotivated, external, and introjected scores (Sheldon et al., 2017). This aggregate score attempts to locate participants somewhere along the RAC.

SWB. To assess mood I used the 9-item scale employed by Emmons (1991); the positive emotion words *were happy, joyful, pleased, cheerful,* and *enjoyment/fun,* and the negative words were *sad, worried, frustrated,* and *upset*. I also administered the 5-item satisfaction with life scale (Diener, Emmons, Larsen, & Griffin, 1985; "in most ways, my life is close to my ideal"). The same prompt, that is, "please indicate to what extent you feel this way right now in your life," was used at both Time 1 and Time 2, and a 5-point "strongly disagree" to "strongly agree" response scale was provided. Subjective well-being (SWB) scores were computed by standardizing the three measures and then subtracting negative affect from the sum of positive affect and life-satisfaction (Busseri, 2018; Diener, 1994).

Hike performance. At Time 2 participants were asked "Did you finish the PCT?" "No" and "Yes" options were provided. Participants were also asked "Regardless of whether you finished, how many miles, total, did you cover on your trip?" A sliding scale from 0 to 3000 miles was provided. Because these two measures were highly correlated, $r = .73$, $p < .001$, for efficiency I created a third performance measure by standardizing then averaging the two scores.

Results

Descriptive Statistics

Table 1 contains descriptive statistics for all variables. As can be seen, participants began the hike with strongly autonomous motivations, led by intrinsic then identified motivation. As expected, their external motivation and amotivation scores were quite low.

As a preliminary analysis I conducted seven paired *t* tests evaluating sample-wide changes in motivation. Six of the tests were significant at $p < .001$, such that intrinsic motivation and the RAI significantly *decreased*, whereas the other four motivations significantly *increased* (in the seventh test, self-esteem motivation also increased, at $p = .027$). It appears that the hike tended to undermine peoples' intrinsic and autonomous motivations, while also bolstering their extrinsic motivations. Although this may appear problematic, SWB increased almost a full point (on average) between Time 1 and Time 2 ($p < .01$), indicating that the journey had a positive impact on most participants.

Hypothesis Tests

Table 2 presents correlations between the Time 1 predictors and the four outcomes. Inconsistent with Hypothesis 1, none of the initial motivation variables predicted the three hike performance variables.

Table 1
Descriptive Statistics for Time 1 and Time 2 Variables (N = 93)

Variable	Mean (*SD*)	Range	Alpha	Paired *t*	Cohen's *d*
Outcomes					
Completion, N or Y	44.1%	0 or 1	na		
Total Miles	1834 (914)	13 to 3000	na		
Aggreg. Performance	.00 (.93)	−1.44 to 1.05	na		
WB1	3.86 (2.21)	−.90 to 8.80	.87	4.55	.47
WB2	4.79 (2.21)	−.70 to 8.20	.86		
Motivation Variables					
Intrinsic Mot1	4.34 (.58)	2.25 to 5.00	.75	3.89	.41
Intrinsic Mot2	3.91 (1.03)	1.00 to 5.00	.93		
Identified Mot1	3.92 (.89)	1.00 to 5.00	.85	3.59	.37
Identified Mot2	4.22 (.85)	1.75 to 5.00	.86		
Self-esteem Mot1	3.66 (1.09)	1.00 to 5.00	.90	2.25	.23
Self-esteem Mot2	3.87 (1.09)	1.00 to 5.00	.88		
Introjected Mot1	1.78 (.91)	1.00 to 4.50	.81	7.94	.82
Introjected Mot2	2.72 (1.29)	1.00 to 5.00	.91		
External Mot1	1.12 (.24)	1.00 to 2.00	.18	3.55	.37
External Mot2	1.30 (.49)	1.00 to 2.00	.61		
Amotivation1	1.24 (.40)	1.00 to 3.25	.61	3.55	.37
Amotivation2	1.49 (.69)	1.00 to 4.50	.81		
Aggregate RAI1	7.78 (1.64)	3.00 to 11.00	.67	4.77	.49
Aggregate RAI2	6.50 (2.71)	−2.75 to 12.25	.69		

Note. Time 1 variables are indicated by a 1 at the end of the variable name, Time 2 variables by a 2.

To examine how *changes* in hike motivations relate to the outcomes, I conducted stepwise regression analyses focusing on aggregate hike performance (results were the same for PCT completion and total distance, analyzed separately). In the first analysis performance was regressed upon the six Time 1 motivation variables at Step 1, then the six Time 2 motivation variables at Step 2. At step one none of the initial motivation variables were significant, echoing Table 2. However at step two, Time 2 identified motivation ($\beta = .41$, $p = .003$) and introjected motivation ($\beta = .45$, $p = .002$) were both significant predictors of performance. An additional analysis showed that neither Time 1 nor Time 2 aggregate RAI predicted performance, indicating that it was increases in introjected and identified motivation, specifically, that were important.

Regression analyses showed that actually finishing the PCT, or covering more distance overall, failed to predict boosted SWB ($ps > .10$). To test hypothesis 2, which stated that the combination of autonomous motivation and high performance *would* boost SWB, I conducted stepwise moderator analyses predicting Time 2 SWB using the aggregate RAI and aggregate hike performance variables.

Table 2
Correlations Between T1 Predictors and Outcomes

Predictor	Completion	Miles	Aggregate	SWB1	SWB2
Performance					
Intrinsic Mot1	.161	.138	.160	.079	.170
Identified Mot1	.015	.017	.018	.035	.006
Self-esteem Mot1	−.054	−.117	−.092	−.083	−.099
Introjected Mot1	.071	−.058	.007	−.278***	−.207**
External Mot1	.072	−.034	.021	.035	.038
Amotivation1	−.117	−.160	−.149	−.146	−.210**
Aggregate RAI1	.007	.056	.034	.175*	.157

* $p < .10$. ** $p < .05$. *** $p < .01$.

In a first analysis, at Step 1, Time 1 SWB was significant ($\beta = .64$, $p < .001$), and Time 1 RAI was again nonsignificant. Hike performance itself approached but did not attain significance ($\beta = .143$, $p = .086$). More importantly, at Step 2 the interaction product term was significant; the association of hike performance with SWB was stronger to the extent the participant was high on the RAI at Time 1 ($\beta = .930$, $p = .010$; see Figure 1a, graphed at ± 1 *SD*). In a second analysis the Time 2 RAI x hike performance interaction was also significant ($\beta = .570$, $p = .011$; see Figure 1B). Thus, hike performance only boosted SWB to the extent the participant began with relatively autonomous motivation or developed it over the course of the hike.

Discussion

This study examined a very unusual sample: backpackers attempting the difficult PCT thru-hike. The study afforded a chance to Test SDT propositions in a new way, using participants engaged in this monumental endurance task.

The sample as a whole decreased in intrinsic motivation and increased in the five extrinsic motivations during the summer, reflecting the difficulties of the hike. Still, participants (on average) reported increased SWB at Time 2, suggesting that undertaking the journey, despite its motivational difficulties, was worth it.

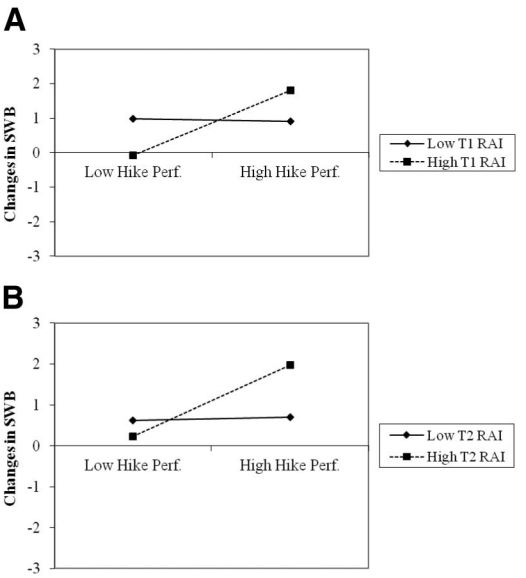

Figure 1. A: Moderating effects of Time 1 Relative Autonomy Index upon the effect of Hike Performance on Changes in SWB; B: Moderating effects of Time 2 Relative Autonomy Index upon the effect of Hike Performance on Changes in SWB, controlling for Time 1 Relative Autonomy Index.

Interestingly, Time 1 motivations did not predict completion or distance. However, Time 2 increases in both introjected and identified motivation were associated with hike performance. Since both of these motivations are at least somewhat internalized, this suggests that developing more autonomous motivation is important for this difficult task. Also supporting the importance of autonomous motivation, Time 1 (Figure 1A) and Time 2 autonomous motivation (Figure 1B) both strengthened the link between hike performance and heightened SWB. The latter analyses also reveal the limited benefits of introjected motivation, located on the controlled side of the RAC. Although increased introjection helped participants complete the hike, it did not help participants improve their SWB as a result. These moderator patterns are in line with research by Sheldon and Elliot (1999) and Sheldon and Kasser (1998) showing that goal-attainment has more positive effects on well-being when the goals are pursued for more autonomous reasons.

One study limitation was the relatively small sample size of the study. Unfortunately, many researchers post survey requests to the relevant listservs, and also, most PCT hikers are quite independent and averse to filling out questionnaires. It is possible that these factors introduced self-selection biases, such that the obtained results might not generalize to the entire population of PCT thru-hikers. Another limitation was the reliance on self-report; it would have been desirable to obtain family or friend reports regarding participants' motivations, SWB, and hike performance, to corroborate the patterns. Finally, it will be important to generalize the results to other extreme endurance endeavors, such as hiking the Appalachian Trail, participating in Ironman competitions, or running ultramarathons (Lamont & Kennelly, 2012).

In conclusion, motivation matters for enacting endurance challenges. However, most important may be the motivation that one develops *during* the event, not the motivation one *begins* with. In particular, developing more internalized motivation, particularly identified and in-

trojected motivations, may be essential for performance. Of the two, identified motivation is preferable, because unlike introjected motivation, identified motivation is autonomous and is associated with hiker SWB. In addition, autonomous motivation boosts the effect of hike completion upon *changes* in SWB. In this case both the quantity and the quality of motivation are maximized, in service of a cherished life-goal.

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